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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/751,214	12/29/2000	Sudipto Neogi	042390.P99975	8876

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Michael A. Bernadicou
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Seventh Floor
12400 Wilshire Boulevard
Los Angeles, CA 90025-1026

EXAMINER

ANDUJAR, LEONARDO

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 04/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/751,214

Applicant(s)

NEOGI ET AL.

Examiner

Leonardo Andújar

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-13, 15-23 and 25-27 is/are pending in the application.
- 4a) Of the above claim(s) 15-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-13, 23 and 25-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Acknowledgment

1. The amendment filed on 01/15/2004 in response to the Office action mailed on 06/19/2003 has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1-3, 5-13, 15-23 and 25-27.

Election/Restrictions

2. Applicant's election without traverse of Group I (device claims) in Paper No. 6 is acknowledged. Therefore, claims 15-22 are withdrawn from further consideration as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

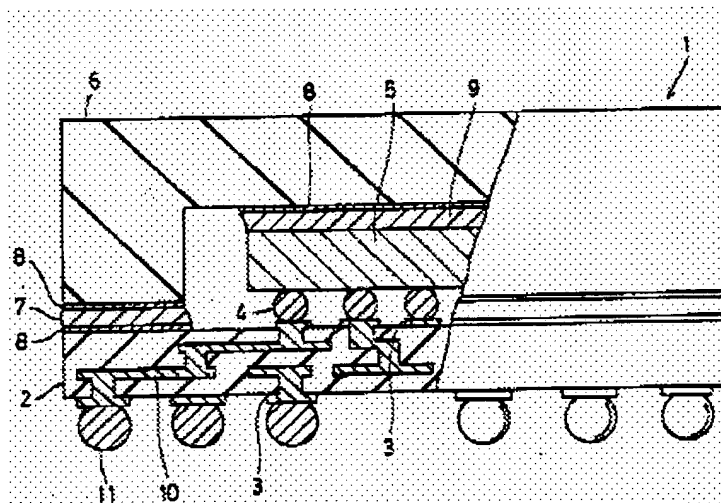
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3, 6-10, 13, 23 and 25-27 rejected under 35 U.S.C. 103(a) as being unpatentable over Tetsuya (JP-04083363 cited by Applicant) in view of Yukihiro (JP-0623284 cited by Applicant).

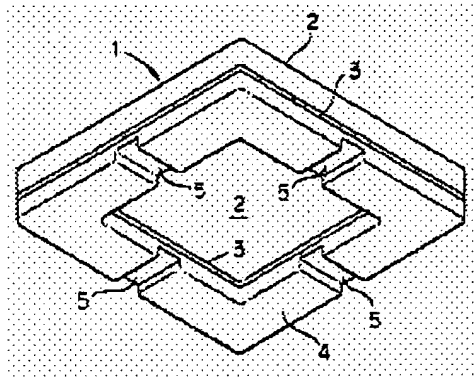
5. Regarding claims 1 and 13, Tetsuya (e.g. fig. 4) shows a package comprising:

Art Unit: 2826

- A substrate 2 with an inner surface to which a die 5 is to be attached, forming electrical connections 10 through the substrate, between the die and the exterior of the package;
- A lid 6 with an inner surface facing the inner surface of the substrate;
- Thermal attach 9 disposed between the die and the inner surface of the lid;
- And sealant 7 disposed between the substrate and the lid to bond the lid to the substrate.



6. Tetsuya does not show that the sealant is disposed in a pattern with at least one break in the pattern, wherein the at least one break in the pattern remains after the substrate and the lid are assembled together. Nonetheless, Yukihiro (e.g. fig. 1) shows a sealant 4 that is disposed in a pattern with at least one break 5 in the pattern, wherein the at least one break in the pattern remains after the substrate 11 and the lid 1 are assembled together. According to Yukihiro, this type of embodiment is used to prevent high pressure in the inside of the package and to eliminate the scattering in the soldering (abstract).



It would have been obvious to one of ordinary skill in the art at the time the invention was made to make sealant disclosed by Tetsuya having a pattern with at least one break in the pattern, wherein the at least one break remains after the substrate and the lid are assembled together in order to prevent high pressure in the inside of the package and to eliminate the scattering in the soldering as taught by Yukihiro.

7. Regarding claim 2, Tetsuya shows that the package is a ball grid array package.

8. Regarding claim 3, Yukihiro discloses that the substrate 11 is a pin grid array (e.g. fig. 2).

9. Regarding claims 6 and 25, Yukihiro shows that sealant is disposed between the lid and the substrate is a substantially rectangular pattern with at least one break.

10. Regarding claims 7 and 26, Yukihiro shows that the rectangular pattern has four breaks, one in each side of the substantially rectangular pattern.

11. Regarding claim 8, Tetsuya in view of Yukihiro discloses most aspects of the instant invention including a rectangular pattern having four breaks, one in each side of the substantially rectangular. Tetsuya in view of Yukihiro does not explicitly disclose that the four breaks comprise a minimum 10% of the rectangular pattern. Nonetheless, the specification contains no disclosure of either the critical nature of the claimed

arrangement or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In *re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990). The specific length of the break claimed by applicant, i.e., a minimum 10% of the rectangular pattern, absent any criticality, is only considered to be the "optimum" length of the break pattern disclosed by the Prior Art that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, manufacturing costs, etc. (see *In re Boesch*, 205 USPQ 215 (CCPA 1980)).

12. Regarding claim 9, Tetsuya in view of Yukihiro shows most aspects of the instant invention. However, Tetsuya in view of Yukihiro does not disclose that the sealant pattern is shaped to include breaks at the corners. Nonetheless, this limitation, absent any criticality, is only considered to be an obvious modification of the shape of the sealant pattern disclosed by Prior Art as the courts have held that a change in shape or configuration, without any criticality, is within the level of skill in the art as the particular shape claimed by applicant is nothing more than one of numerous shapes that a person having ordinary skill in the art will find obvious to provide using routine experimentation based on its suitability for the intended use of the invention. See *In re Dailey*, 149 USPQ 47 (CCPA 1976).

13. Regarding claim 10, Tetsuya in view of Yukihiro discloses most aspects of the instant invention including a rectangular pattern having four breaks, one in each corner

of the substantially rectangular pattern. Tetsuya in view of Yukihiro does not explicitly disclose that the four breaks comprise a minimum 10% of the rectangular pattern. Nonetheless, the specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In *re* Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990). The specific length of the break claimed by applicant, i.e., a minimum 10% of the rectangular pattern, absent any criticality, is only considered to be the “optimum” length of the break pattern disclosed by the Prior Art that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, manufacturing costs, etc. (see *In re* Boesch, 205 USPQ 215 (CCPA 1980)).

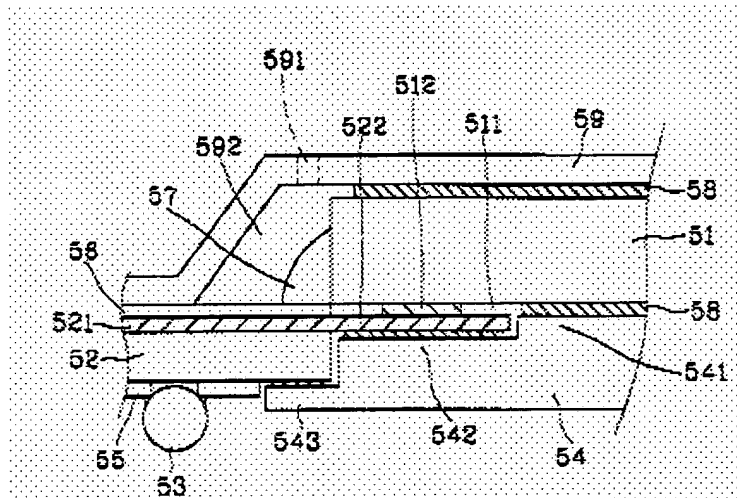
14. Regarding claims 13 and 27, Tetsuya teaches that the die attached to the substrate using controlled collapsed chip connections 4.

15. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tetsuya (JP-04083363 cited by Applicant) in view of Yukihiro (JP-0623284 cited by Applicant) further in view of Chen et al. (US 6,215,180).

16. Regarding claim 5, Tetsuya in view of Yukihiro shows most aspects of the claimed invention except vent holes formed through the lid. Nevertheless, Chen (e.g. fig. 6) shows a semiconductor device having vent holes 591 formed through the lid 59.

Art Unit: 2826

According to Chen the apertures 591 may enable moisture trapped in the package interior escaping out of the package to avoid possible pop corn effect (col. 5/lis. 25-27).



It would have been obvious to one of ordinary skill in the art at the time the invention was made to form vent holes through the lid disclosed by Tetsuya in view of Yukihiro in order to enable moisture trapped in the package interior escaping out of the package to avoid possible pop corn effect as taught by Chen.

17. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over (JP-04083363 cited by Applicant) in view of Yukihiro (JP-0623284 cited by Applicant) further in view of Harper (previously cited).

18. Regarding claims 11 and 12, Tetsuya in view of Yukihiro discloses most aspects of the instant invention including a wiring substrate 3. Tetsuya in view of Yukihiro does not disclose the specific material used to make the substrate such as an organic material. Harper discloses that polyimides (organic and insulating) are extensively used in the electronic industry (i.e. multilayer circuit board, chip carrier, laminates, flexible circuits etc) because they have good heat resistance and good electrical properties at

Art Unit: 2826

high temperatures (page 1.9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the Tetsuya in view of Yukihiro's substrate of polyimide (organic and insulating) in order to provide an insulating material having good heat resistance and good electrical properties at high temperatures as taught by Harper. Although Tetsuya in view of Yukihiro further in view of Harper does not explicitly disclose that the polyimides is susceptible of absorbing moisture and to release it as steam causing a pressure increase inside the package this phenomena is implicit in their teachings. Note that it is a scientific fact (inherent) that polyimides are capable of absorbing moisture and are capable to release it as steam when the temperature is increased (e.g. during soldering) hence causing an increment of the package inner pressure.

Response to Arguments

19. Applicant's arguments with respect to claim 1-3, 5-13, 23 and 25-27 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then

Art Unit: 2826

the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST.

22. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

24. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass (es): 257/683, 778,796; 438/108, 124	04/04
Other Documentation:	

Application/Control Number: 09/751,214

Page 10

Art Unit: 2826


Electronic Database(s): East (USPAT, US PGPUB, JPO, EPO, Derwent, IBM TDB)	04/04
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Leonardo Andújar

Patent Examiner Art Unit 2826

LA

4/13/04


NATHAN J. FLYNN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800